

## Classical Reality as Clouds of Crystalline Bits

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<https://youtu.be/wIoDO1kIS6M&lc=UgyQzLQw6Nksa-Nr5gB4AaABAq>

A Comment on the [Closer To Truth](#) YouTube post:  
Seth Lloyd - *Is Information Fundamental?* (Jun 26, 2023)  
<https://youtu.be/wIoDO1kIS6M?t=2m14s>

2:14 SL: "*Quantum mechanics [says] if you look [closely enough] there aren't any more bits. [When] you look at the proton [and] get down to [its] spin ... that's it: There isn't anything more.*" Beautiful! A defining feature of the inherently non-testable (INT) theories that have dominated physics theory funding for half a century is disregarding Max Planck's century-old point. Planck foams, superstrings, the infinitely detailed universal wave functions of Everett's many-worlds, and (more subtly) Minkowski's infinitely long, infinitely precise worldlines all require the view that if you *look closely enough*, the underlying universe *must* contain an infinite number of details.

0:52 SL: "*The universe is computing: It consists of bits of information... [2:37] To my mind, the major role that quantum mechanics plays in our universe is to make information finite — to make the universe digital.*"

Professor Lloyd, I'm naught but a poor, bewildered information specialist. However, I hope you might consider a slightly different way of thinking about what you just said, which connects better with your Geometric Event-Based (GEB) quantum mechanics: Rather than treating them as fundamental, it is better to treat bits as extraordinarily complicated little machines full of loops and repeating behaviors. These machines *emerge*, like clouds of tiny crystals, only when a set of delicate and rather unlikely preconditions come together.

The formless medium — the word *tohu* is tempting — from which these bit clouds emerge is neither quantum nor classical. It has fewer, not more, dimensions than spacetime, and the 3-separations between its events are the squares of the numbers we use in classical spaces. Regarding complexity, Hilbert spaces are to this formless medium roughly what humans are to bacteria.

The medium is timeless not because it lacks change but because it lacks *bits*. Only after conditions are ripe for a slurry of bits to crystalize out can the narrower concept of xyz space, as we think of it, be defined meaningfully. Only after space comes into existence can local *time*, the formation of repeating bit patterns, acquire enough meaning to say, with some decent level of confidence, what "was," what "is," and what "will be."

The deeper cause of special relativity is not some complex space but a *lack* of space — an absence of metrics once you leave your local bubble of scintillating space-and-time defining bits. The formless separations remain, and persistent bits give the illusion of universal time. But it's only events, with some repeating enough to create the scattering of precious bits, that create time, history, and meaning.

There is no universal wave function. There cannot even be a universal concept of time. The best you can do is a hodge-podge of clumsily patched-together clouds of locally classical bits, what we somewhat naively call "frames of reference." The simpler separations of the formless energy keep them from stepping on each other.

The quantum world below is just as emergent: The boundary between crystalized bits, most of them "particles," and the formless world below. It is the glass bottom in the classical boat, at which the bit crystals give up, at least in part, on defining the rather ratty concepts we call local xyz and t.

But again: I'm just a poor, bewildered information specialist. Still, I like your work, and you could do so much better if you'd stop using those exceptionally classical Hilbert spaces to describe events better characterized by the *absence* of pretty spaces with pretty orthogonalities. Spaces and angles become sharply defined only when you have enough *bits*, such as in condensed matter physics, to *make* them sharply defined.